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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
KANG, DONGHEE	
ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 04/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/945,491	FORBES ET AL.	
	Examiner	Art Unit	
	Donghee Kang	2811	

-- The MAILING DATE of this communication appears on the cover sheet with th correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-47 and 61-71* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-47 and 61-71* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continuing Domestic Data

1. Acknowledgment is made that this is a continuation of U.S.Patent Application Serial No.09/258,363, filed February 26, 1999, which issued as U.S.Patent No. 6,288,437.

Election/Restrictions

2. Applicant's election without traverse of Group I (Claims 1-47 & 61-71) in Paper No. 5 is acknowledged. Claims 48-60 & 72-94 have been cancelled.

Information Disclosure Statement

3. Acknowledgment is made of receipt of applicant's Information Disclosure Statement (PTO-1449) field 30 August 2001.

Double Patenting

4. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

5. Claims **2, 14-16, 20-23, 29-31, 61, 63-64, 66-69 & 71** are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 47-54 of prior U.S. Patent No. 6,288,437. This is a double patenting rejection.

Claim **2** is identical to claim 2 of the U.S. Pat. 6,288,437.

Claim **14** is identical to claim 13 of the U.S. Pat. 6,288,437.

Claim **15** is identical to claim 14 of the U.S. Pat. 6,288,437

Claim **16** is identical to claim 15 of the U.S. Pat. 6,288,437

Claim **20** is identical to claim 19 of the U.S. Pat. 6,288,437.

Claim **21** is identical to claim 20 of the U.S. Pat. 6,288,437.

Claim **22** is identical to claim 21 of the U.S. Pat. 6,288,437.

Claim **23** is identical to claim 22 of the U.S. Pat. 6,288,437.

Claim **29** is identical to claim 28 of the U.S.6,288,437.

Claim **30** is identical claim 29 of the U.S. Pat. 6,288,437.

Claim **31** is identical to claim 30 of the U.S. Pat. 6,288,437.

Claim **61** is identical to claim 47 of the U.S. Pat. 6,288,437.

Claim **63** is identical to claim 48 of the U.S. Pat. 6,288,437.

Claim **64** is identical to claim 49 of the U.S. Pat. 6,288,437.

Claim **66** is identical to claim 50 of the U.S. Pat. 6,288,437.

Claim **67** is identical to claim 51 of the U.S. Pat. 6,288,437.

Claim **68** is identical to claim 52 of the U.S. Pat. 6,288,437.

Claim **69** is identical to claim 53 of the U.S. Pat. 6,288,437.

Claim **71** is identical to claim 54 of the U.S. Pat. 6,288,437.

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA

1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims **1, 3-13, 24-28, 49, 65 & 70** are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2-12, 23-27, 47-48 & 53 of U.S. Patent No. 6,288,437. Although the conflicting claims are not identical, they are not patentably distinct from each other because the present claimed invention is a broader recitation of the patented claims.

For instance, claim **1** of present claimed invention is a broader of claim 2 of US 6,288,437 patent. Dependent claims **3-5** are identical to claims 3-5 of the US 6,288,437.

Claim **6** of present claimed invention is a broader of claim 6 of US 6,288,437 patent. Dependent claims **7-9** are identical to claims 7-9 of the US 6,288,437.

Claims **10-11** of present claimed invention is a broader of claim 10 of the U.S. 6,288,437. Dependent claims **12-13** are identical to claims 11-12 of the U.S.6,288,437.

Claim **24** obviously encompasses a claim 23 of the U.S.6,288,437 and differ only in terminology. For instance, *a first layer* within the chamber would meet the "*a layer* within the chamber". Dependent claims **25-28** are identical to claims 24-27 of the U.S. 6,288,437.

Claim **62** obviously encompasses a claim 47 of the U.S. Pat. 6,288,437 and differ only in terminology.

Claim **65** obviously encompasses a claim 48 of the U.S. Pat. 6,288,437 and differ only in terminology.

Claim **70** obviously encompasses a claim 53 of the U.S. Pat. 6,288,437 and differ only in terminology.

Thus, in respect to above discussion, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to use the teachings of claims 2-12, 23-27, 47-48 & 53 of U.S. Patent No. 6,288,437 as a general teachings for a programmable element to perform the same functions as claimed by present application.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims **1, 6 & 39** are rejected under 35 U.S.C. 102(b) as being anticipated by Jun (US 5,652,169).

Regarding claim **1**, Jun teaches an antifuse structure in an integrated circuit, comprising (Fig.6):

first (53) and second (57) noncontacting conductive members; and means (60) for moving the second conductive member relative the first conductive member (Col.3, line 60-Col.4, line 41).

Regarding claim **6**, Jun teaches an antifuse in an integrated circuit, comprising (Fig.6):

first (53) and second (57) noncontacting conductive members; and a layer (58, silicon nitride) adjacent to one of the first and second noncontacting conductive members, whereby silicon nitride material comprises nitrogen, known to be a gas in solid solution with silicon (Col.3, line 60-Col.4, line 41).

Regarding claim **39**, Jun teaches a structure for a programmable electrical connection in an integrated circuit, comprising (Fig.6):

first (53) and second (57) conductive members; and means (60) for moving the second conductive member relative the first conductive member (Col.3, line 60-Col.4, line 41).

10. Claims **17-19** are rejected under 35 U.S.C. 102(b) as being anticipated by Velde et al. (US 4,528,583).

Velde et al. teach an antifuse structure integrated circuit, comprising (Figs.1-3):

a vacuum or gas filled, hollow space chamber (21) having a top bounded by aluminum wire (10), a bottom bounded by a semiconductor substrate that includes a silicon oxide (6) covered epitaxial layer (3), and interior walls extending between the top and bottom, a titanium contact layer (8), and a platinum layer (11). Velde et al. do not

expressly teach the titanium contact layer is a high-gas-saturable layer and the platinum layer is low-gas-saturable layer, wherein the high-gas-saturable layer has a hydrogen-gas-solubility at least 10 times greater than that of the conductive, low-gas-saturable layer. However, this feature is inherent in Velde's device because they are composed of same material.

11. Claim **36** is rejected under 35 U.S.C. 102(b) as being anticipated by Mukai (US 4,968,643).

Mukai teaches a structure for a programmable electrical connection in an integrated circuit, comprising (Fig.8):

a chamber having a bottom and a top and interior walls extending between the top and bottom; a conductive layer within the chamber; and conductive members (18), each overhanging the top of the chamber.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims **32-35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukai (US 4,968,643).

Regarding claim **32**, Mukai teaches an antifuse structure in an integrated circuit, comprising (Fig.8):

a chamber having a bottom and a top and interior walls extending between the top and bottom; a conductive layer within the chamber and comprising aluminum; and first and second conductive members each overhanging the top of the chamber. Mukai does not expressly teach the first and second conductive members each overhanging the top of the chamber by at least 250 angstroms. Since Mukai notes that the chamber having a about 0.9 micron in lateral breath, one would have been expected to have achieved the claimed overhanging dimension inasmuch as the right-most overhang covers approximately one-half the lateral breadth of the chamber.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first and second conductive members overhanging the top of the chamber by at least 250 angstrom, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim **33**, Mukai teaches the chamber comprises:

a substrate (6); and an insulative layer (15) on the substrate and having an opening exposing a portion of the substrate, with the exposed portion of the substrate defining at least portion of the bottom of the chamber and the opening defining the interior sidewalls of the chamber.

Regarding claim **34**, Mukai teaches an antifuse structure in an integrated circuit, comprising (Fig.9):

a chamber having a bottom and a top and interior walls extending between the top and bottom; a conductive layer within the chamber and comprising aluminum; and first and second conductive members each overhanging the top of the chamber and contacting the conductive layer within the chamber. Mukai does not expressly teach the first and second conductive members each overhanging the top of the chamber by at least 250 angstroms. Since Mukai notes that the chamber having a about 0.9 micron in lateral breath, one would have been expected to have achieved the claimed overhanging dimension inasmuch as the right-most overhang covers approximately one-half the lateral breadth of the chamber.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first and second conductive members overhanging the top of the chamber by at least 250 angstrom, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim **35**, Mukai teaches the first and second conductive members are fused to the conductive layer.

14. Claims **37-38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Werner et al. (US 6,080,649).

Regarding claim **37**, Werner et al. teach a programmable electrical connection comprising (Figs. 5 & 9):

a layer having a cavity (H); first and second conductive members (5) having respective first and second ends overhanging the cavity; a third conductive members (S) in the cavity spaced from the first and second ends; and upon programming with electrical current, the fuse would have blown and scattered parts thereof towards the two overhanging conductive members. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to displace the third conductive member toward the first and second ends of the first, since the fuse have blown and scattered parts thereof towards the two overhanging conductive members.

Regarding claim **38**, Werner et al. teach a silicon nitride layer (6), which includes nitrogen gas in solid solution with silicon.

15. Claims **40-47** are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 5,912,571) in view of Jun (US 5,652,169).

Li et al. teaches an integrated circuit comprising (Fig.2):

transistor (230); and programmable electrical connection (F1) integral to the circuit and coupled to the transistor. Li et al. teach using antifuse as programmable elements instead fuse (Col.5, lines 48-50).

Li et al. do not expressly the programmable electrical connection comprising:

at least a first and a second conductive member; and means for moving the second conductive member relative the first conductive member, wherein the means for moving the second conductive member relative the first conductive member moves the second conductive member toward the first conductive member.

However, Jun in Fig.6 teaches the antifuse comprising at least a first (53) and a second (57) conductive member; and means (60) for moving the second conductive member relative the first conductive member, wherein the means for moving the second conductive member relative the first conductive member moves the second conductive member toward the first conductive member (see fig.6B). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching Jun with Li's device, since the antifuse as taught by Jun can reduce contact resistance and improve the reliability of the element by forming a uniform connection between the two conductors.

16. Claims **46-47** are rejected under 35 U.S.C. 103(a) as being unpatentable over Jefferson et al. (US 6,115,312) in view of Li et al. (US 5,912,571) and further in view of Jun (US 5,652,169).

Jefferson et al. teach a system comprising (Fig.6):

a processor; and memory cells. Jefferson et al do not expressly teach programmable electrical connection coupled to redundant memory cell. Li et al. in Fig.2 teach programmable electrical connection (F1) coupled to redundant memory cell (210). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Li with Jefferson, since

Neither Jefferson nor Li teach the programmable electrical connection comprising:

at least a first and a second conductive member; and means for moving the second conductive member relative the first conductive member, wherein the means for moving the second conductive member relative the first conductive member moves the second conductive member toward the first conductive member.

However, Jun in Fig.6 teaches the antifuse comprising at least a first (53) and a second (57) conductive member; and means (60) for moving the second conductive member relative the first conductive member, wherein the means for moving the second conductive member relative the first conductive member moves the second conductive member toward the first conductive member (see fig.6B). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching Jun with Jefferson's device as modified by Li, since the antifuse as taught by Jun can reduce contact resistance and improve the reliability of the element by forming a uniform connection between the two conductors.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Donghee Kang
Examiner
Art Unit 2811

dhk
April 7, 2003